Japanese Journal of Ichthyology
Vol. 31, No. 1 1984

魚類学雑誌
31巻1号 1984年

# A New Trichonotid Fish from the Yaeyama Islands, Okinawa Prefecture, Japan

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(Received August 22, 1983)

**Abstract** A new trichonotid fish, *Trichonotus elegans*, is described, based upon specimens collected from Hatoma Island, one of the Yaeyama Islands, Japan. This new species differs from all other species of the genus in having scaleless portions on the anterior half of body.

Sixteen specimens of *Trichonotus*, recently collected from sandy slopes of Hatoma Island, are described as new. Counts and measurements follow Hubbs and Lagler (1947). Vertebrae and pterygiophores are counted from radiographs and cleared and stained specimens.

***Trichonotus elegans*** sp. nov.
(New Japanese name: Ryūgū-beraginpo)
(Figs. 1–4)

**Holotype.** URM-P (Department of Marine Sciences of the University of the Ryukyus) 6413, 114.3 mm SL, male, collected by K. Shimada, Aug. 1, 1980, sandy slope at about 20 m depth, SSE side of Hatoma Island, 24°28′N, 123°49′E, Yaeyama Islands, Okinawa Pref., Japan.

**Paratypes.** URM-P 6403, 127.3 mm SL, male, collected by M.E.R.S. (The Marine Ecological Researching Society of Kagoshima University), Aug. 1979, same locality as holotype; URM-P 6405 and 6407, 65.6 and 76.0 mm SL, Nov. 10, 1979, same locality as holotype, depth (10–30 m); URM-P 6410–6412, 3 specimens, 69.3–110.8 mm SL. collected with holotype; FAKU (Department of Fisheries, Faculty of Agriculture, Kyoto University) 107001 and107000, 59.5 and 105.9 mm SL, Nov. 10, 1979, same locality as holotype, depth (10–30 m); NSMT-P (Department of Zoology, National Science Museum, Tokyo) 23035 and 23036, 56.1 and 108.0 mm SL, Nov. 10, 1979 and Aug. 1, 1980, same locality as holotype.

**Diagnosis.** A species of *Trichonotus* with scaleless portions above and below lateral line anteriorly. Dorsal fin rays III, 43–45; anal fin rays I, 39–42; vertebrae 53–56. 15 to 17 grayish saddle bands along dorsal fin base in male, three longitudinal series of dark spots from posterior part of head to caudal peduncle in female.

**Description.** Pelvic fin rays I, 5; branchiostegal rays 7 (6+1); predorsal bone 1; epural 1; other counts and proportional measurements are shown in Table 1.

Body elongate, cylindrical and gradually compressed backward. Snout pointed. Mouth large, slightly oblique; maxilla extending to or slightly beyond a vertical at anterior edge of pupil; lower jaw slightly projecting beyond the upper. Lower jaw with a single row of canine-like teeth and two or three pairs of enlarged teeth at near symphysis. Upper jaw with a single row of canine-like teeth, broadening to two rows posteriorly, and several pairs of enlarged teeth on anterior sides. Similar teeth in a row on palatines, and on vomer in an angular band. Tongue slender, tip rounded. A fold of skin covers margin of eye except for posterior side; eye with about 15 hairlike iris lappets radiating across pupil from dorsal side of iris. Interorbital narrow, about a half of eye diameter. Nostrils 2, anterior nostril with a slightly elevated fleshy rim. Gill membrane free from isthmus. Gill rakers bladelike on outer face of 1st gill arch, most of them with several spinules; those on inner face of 1st gill arch with a row of small branchial teeth bearing spines. First to 6th branchiostegal rays on ceratohyal and 7th one on epihyal. Glossohyal narrow and elongate. A broad predorsal bone between 1st and 2nd neural spines; 1st dorsal pterygiophore inserted between 4th and 5th neural spines; 3 or 4 free pterygiophores between 5th and 8th neural spines (Fig. 2). First anal pterygiophore opposite below 15th or 16th vertebrae. Infraorbital canal ending close to supraorbital canal anteriorly (Fig. 3). Dorsal spines flexible and fllamentous, 2nd or 3rd

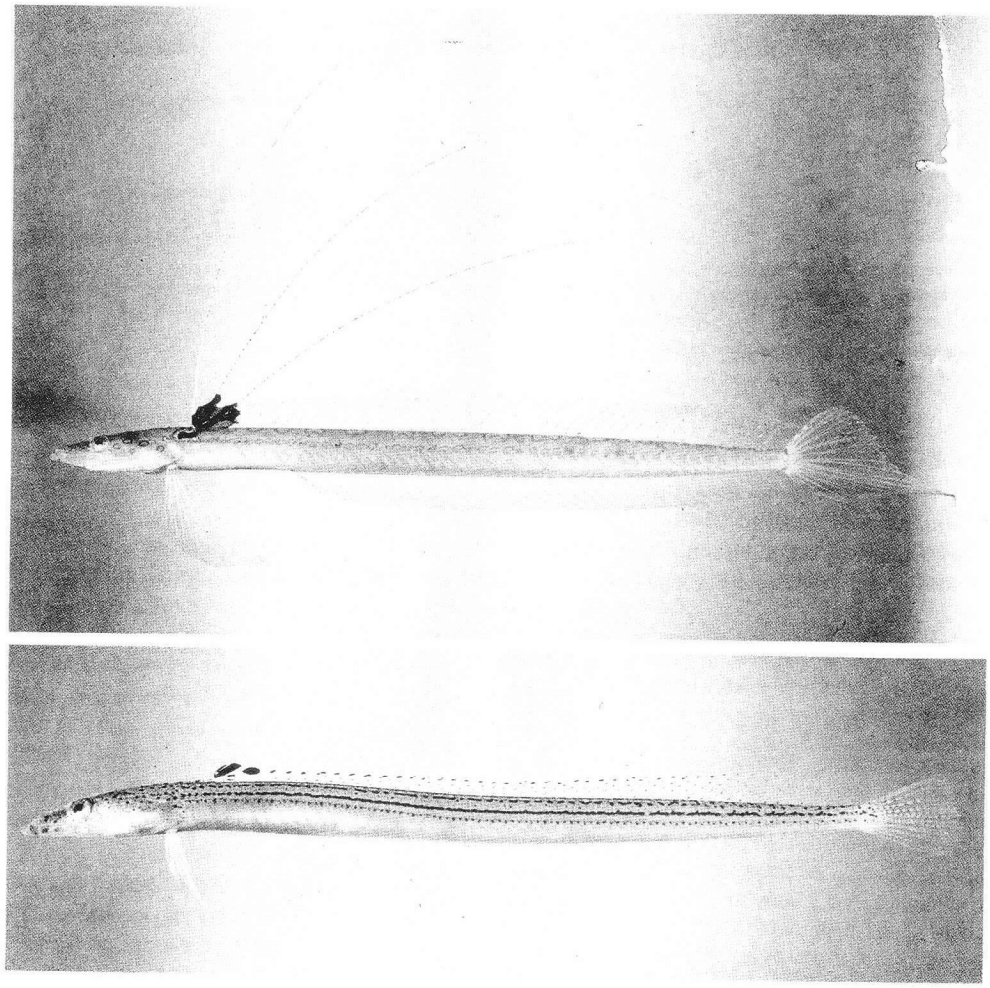

Fig. 1. *Trichonotus elegans* sp. nov. Above, holotype, URM-P 6413, male, 114.3 mm SL, and below, paratype, URM-P. 6411, female, 89.9 mm SL, from Hatoma Island, Yaeyama Islands, Okinawa Pref., Japan.

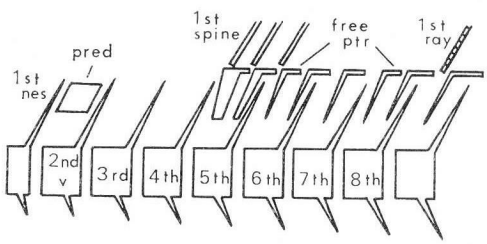


Fig. 2. Schematic representation of anterior vertebral column of *Tsichonotus elegans* sp. nov. pred, predorsal; nes, neural spine; ptr, pterygiophore; v, vertebra (especially showing the position of predorsal and free dorsal pterygiophores).

longest in male, not prolonged in female. Anal spine flexible and shorter than following rays in both sexes. In male, caudal fin lanceolate, asymmetrical; 8th ray longest and filamentous in male. In female the fin rounded. Pelvic fin inserted slightly in advance of pectoral, long and fanlike in male, short in female; longest (4th) ray extending beyond anus in male, not reaching to anus, approximately same length as pectoral fin in female. Scales cycloid; anterior half of body without scales except for along dorsal and anal fin bases, and lateral line of body. Head naked except for several scales on occiput, and a row of three or four embedded scales on postero-ventral margin or eye (Fig. 4).

Table 1. Counts and measurements of *Trichonotus elegans* sp. nov.

| Character | Holotype | Paratypes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | URM-P 6413 Male | URM-P 6403 Male | URM-P 6410 Male | NSMT-P 23036 Male | FAKU 107000 Male | URM-P 6411 Female | URM-P 6407 Female | URM-P 6412 Female | URM-P 6405 Female | FAKU 107001 Female | NSMT-P 23035 Female |
| Standard length (mm) | 114.3 | 127.3 | 110.8 | 108.0 | 105.9 | 89.9 | 76.0 | 69.3 | 65.6 | 59.5 | 56.1 |
| Total length (mm) | 143.7 | 162.3 | 138.2 | 133.6 | 134.3 | 102.6 | 87.5 | 78.2 | 75.3 | 68.0 | 65.5 |
| Dorsal rays | III, 43 | III, 44 | III, 45 | III, 45 | III, 44 | III, 45 | III, 45 | III, 45 | III, 44 | III, 44 | III, 45 |
| Anal rays | I, 40 | I, 39 | I, 40 | I, 40 | I, 40 | I, 39 | I, 39 | I, 41 | I, 41 | I, 41 | I, 42 |
| Pectoral rays | 13 | 14 | 12 | 14 | 14 | 14 | 13 | 14 | 14 | 14 | 14 |
| Principal caudal rays | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 11 | 13 | 13 | 13 |
| Lateral line scales | 57 | 57 | 59 | 59 | 56 | 58 | 57 | 58 | 57 | 57 | 58 |
| Gill rakers | — | 7+22 | — | — | 6+21 | 6+23 | 7+23 | 6+21 | — | — | — |
| Vertebrae | 54 | — | 55 | 56 | 53 | 55 | 54 | 55 | 54 | 55 | 55 |
| Free dorsal pterygiophores | 4 | — | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 |
| In standard length (%) | | | | | | | | | | | |
| Depth of body | 6.1 | 5.9 | 5.8 | 5.8 | 5.6 | 6.2 | 6.2 | 6.3 | 7.2 | 6.2 | 7.0 |
| Length of head | 17.1 | 15.9 | 16.6 | 16.9 | 17.8 | 18.3 | 20.4 | 18.8 | 20.1 | 19.9 | 20.3 |
| Length of snout | 4.7 | 4.2 | 4.2 | 4.0 | 4.5 | 4.2 | 5.3 | 4.5 | 5.2 | 4.0 | 5.0 |
| Length of pectoral fin | 7.9 | 8.3 | 9.0 | 8.6 | 9.1 | 8.9 | 9.2 | 7.9 | 9.6 | 8.6 | 10.2 |
| Length of pelvic fin | 19.2 | 20.8 | 19.9 | 17.4 | 19.8 | 10.6 | 9.2 | 10.1 | 9.9 | 9.6 | 9.1 |
| Length of dorsal fin base | 77.7 | 79.3 | 77.1 | 77.3 | 77.1 | 75.9 | 74.7 | 72.7 | 75.3 | 74.6 | 73.1 |
| Length of anal fin base | 64.2 | 64.1 | 61.7 | 60.9 | 63.2 | 60.0 | 60.0 | 58.0 | 59.8 | 60.6 | 58.3 |
| Length of longest dorsal spine | 62.8 | 62.0 | 55.1 | 39.3 | 58.5 | 7.2 | 11.1 | 7.1 | 5.8 | 6.6 | 5.2 |
| Least depth of caudal peduncle | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.2 | 3.0 | 3.0 | 2.9 | 3.2 |
| Snout to origin of dorsal fin | 19.1 | 17.8 | 17.9 | 18.3 | 19.2 | 19.5 | 21.6 | 21.6 | 22.1 | 21.9 | 23.9 |
| Snout to origin of anal fin | 32.9 | 32.8 | 33.0 | 33.8 | 34.6 | 35.7 | 36.3 | 37.5 | 37.7 | 36.4 | 39.0 |
| Snout to origin of pectoral fin | 16.7 | 16.0 | 16.7 | 16.9 | 17.4 | 18.3 | 20.5 | 18.8 | 19.4 | 19.9 | 20.3 |
| Snout to origin of pelvic fin | 14.6 | 14.5 | 14.3 | 14.4 | 15.7 | 15.8 | 17.0 | 16.9 | 17.8 | 18.0 | 17.5 |
| In head length (%) | | | | | | | | | | | |
| Diameter of eye | 17.4 | 16.7 | 17.4 | 17.8 | 17.5 | 18.8 | 18.7 | 19.2 | 19.7 | 21.2 | 21.1 |
| Width of interorbital | 8.2 | 8.9 | 8.7 | 8.6 | 8.5 | 9.1 | 7.7 | 7.7 | 6.8 | 7.6 | 7.9 |

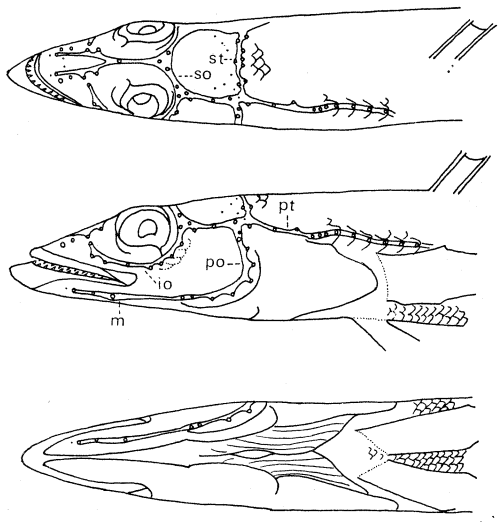


Fig. 3. Cephalic sensory pore system in *Trichonotus elegans* sp. nov. io, infraorbital canal; m, mandibular canal; po, preopercular canal; pt, posttemporal canal; so, supraorbital canal; st, supratemporal canal.

Lateral line complete and almost straight along midline of body.

**Coloration.** Holotype (male), fresh specimen (from 35 mm color transparency): Body pale brown, whitish below. An elongate black blotch above pectoral base with a bluish-white margin. A series of bluish-white ocelli with faded dark rims along lateral midline from uppermost edge of opercle to posterior third of body and several similar ocelli on posterior part of head. Nine yellowish-orange spots superimposed on the series of bluish-white ocelli of body; each anterior five with a small black central spot. Seventeen bluish-white saddle bands with faded dark rims along dorsal base from nape to last dorsal ray. Thread-like dorsal spines with yellowish-orange and whitish bars alternatively; each yellowish-orange bar with dark borders at both ends. Behind 7th dorsal ray, several yellowish-orange spots on each ray and several similar spots on upper half of caudal fin along the rays; dorsal fin membranes between 1st spine and 1st ray with irregular large black and gray patches; margin of pelvic fin and lower fourth of caudal fin slightly dark,

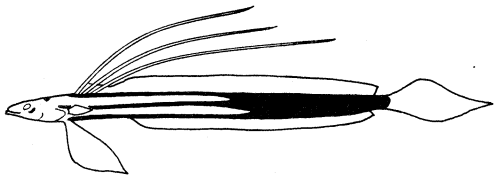

Fig. 4. Squamation in *Trichonotus elegans* sp. nov. Scalecovered areas are shown in black.

Table 2. Comparison of nominal species of *Trichonotus*.

| Source | *T. elegans* | *T. nikii* | *T. marleyi* | *T. setigerus* | *T. filamentosus* | *T. cyclograptus* |
|---|---|---|---|---|---|---|
| | our specimens | Clark and Schmidt (1966) | Smith (1936) | our specimens | our specimens | Alcock (1890) |
| Dorsal rays | III, 43–45 | III, 46 | III, 44 | V–VII, 39–41 | V–VI, 43–44 | IV, 45–46 |
| Anal rays | I, 39–42 | I, 41 | I, 38 | I, 34–36 | I, 36–38 | 39–40* |
| Pectoral rays | 12–14 | 12–13 | 12 | 12–15 | 12–14 | — |
| Lateral line scales | 56–59 | 58 | 57 | 52–55 | 55–57 | 57–59 |
| Gill rakers | 27–30 | 30 | 27** | 26–34 | 24–26 | — |
| | (6–7+21–23) | (7+23) | (6+21) | (6–8+20–26) | (5–6+17–22) | — |
| Vertebrae | 53–56 | — | — | 49–51 | 52–53 | — |
| Scaleless portions above and below lateral line | present | absent | absent | absent | absent | absent |
| Distribution | Japan | Red Sea | South Africa | Indo-West Pacific | Japan and China | Bay of Bengal |

* Total number of anal rays is shown because the fin formula was not given by Alcock (1890).

** After Clark and Schmit (1966).

other fins transparent.

Female, fresh specimen (from color transparency): Body pale brown, whitish below. Three longitudinal series of black spots on upper half of body from posterior part of head to base of caudal fin; ventral series consisting of small black spots; middle series stripe-like because spots are almost continuously arranged; dorsal series consisting of spots. Lower half of head pale, upper half pale brown with small scattered dark spots. Each dorsal ray with one to several dark spots, those on tip of rays conspicuous. Each dorsal membrane between 1st spine and 1st ray with a black blotch; largest one between 2nd and 3rd spines. Upper half of caudal fin with several pale dark spots along rays; other fins transparent.

Color in formalin: Body pale. Markings between 1st spine and 1st ray in both sexes and a blotch above pectoral base in male remain black.

**Ecological notes.** *T. elegans* is a benthic species found on a sandy substrate, usually hovering over the sandy slopes at about 10–30 m depths. This species quickly dives into sand when divers approach, only exposing the dorsal part of head. It usually forms a harem consisting of one male-phase and about a dozen female-phase fish. This harem seems to be kept up by the male-phase fish, because he makes a lateral display when another male-phase fish approaches the harem. The sexual dimorphism recognized in this species is as follows: 1) color pattern, 2) size of male-phase larger than that of female-phase, 3) shape of dorsal, caudal and pelvic fins. A female-phase fish, injected testosterone, exhibited the male-phase characters (color pattern and elongated dorsal spines) within two weeks. Sex reversal in this species is suggested, because males are always larger than females.

**Remarks.** The present new species is closely related to *T. nikii* Clark et Schmidt, 1966 from the Red Sea in having three dorsal spines, membranes between 1st spine and 1st ray with dark blotch, dorsal spines with a series of orange bars, and similar fin ray and vertebral counts, but differs from the latter in having anterior scaleless portions above and below the lateral line (see Table 2). *T. elegans* is also easily distinguishable from *T. setigerus* Bloch et Schneider, *T. filamentosus* (Steindachner), *T. cyclograptus* (Alcock) and *T. marleyi* (Smith) by the coloration and the squamation.

**Etymology.** The species name *elegans* is derived from the elegant body shape and undulating swimming motion.

**Acknowledgments**

We wish to thank the members of the Marine Ecological Researching Society of Kagoshima University and Mr. Hiroshi Takahashi (Japan Snake Institute, Okinawa Branch) for the donation of specimens designated here as the paratypes and for valuable information on *Trichonotus elegans* sp. nov. We also thank Dr. Katherine Muzik for critical reading of the manuscript.

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**八重山諸島から採集されたベラギンポ属の1新種**

**島田和彦・吉野哲夫**

八重山諸島の鳩間島から採集されたベラギンポ属の新種 *Trichonotus elegans* リュウグウベラギンポ（新称）を記載した．本種は，紅海から採集された本属の1種 *T. nikii* と似るが，体側前部の側線鱗上方と下方に鱗がない部分をもつことによって，すべての既知種と容易に区別出来る．

（島田：903 那覇市首里寒川 1–8–2；吉野：903–01 沖縄県西原町 琉球大学理学部海洋学科）